

individuals of a race. In the one case it belongs to the whole race, whilst in the other it is possessed by only particularly fortunate individuals of a race.

Does not this point rather to the operation of exceptional circumstances, in which, possibly, heredity may play a part? How is it that whereas some families appear to have a faculty for contracting every zymotic disease, others exposed to similar conditions, have an equally characteristic faculty for escaping such diseases?

The impression is irresistible that such a faculty is born with or natural to the individual.

It may be argued that the white-rat-race-immunity may also be ascribed to the operation of heredity. This is quite possible, but in the one case the immunity is perfected or heredity has accomplished its work, whilst in the other it is incomplete and is still in an evolutionary stage. The race immunity to diphtheria, or immunity in its perfected condition, is evidently of a different order, and may also very possibly have been developed on quite different lines, from that which we have been discussing in the human subject. In what this difference consists is at present unknown, and until we have a more intimate understanding of the actual condition in the system upon which immunity depends, or a closer insight into the particular agents responsible for its production we cannot hope to arrive at any definite conclusion.

There is, however, another obstacle to a logical acceptance of Wassermann's arguments as to the origin of protective diphtheritic serum in the human system, that is to say, in the light of our present knowledge, for it entails the supposition that such individuals have been subjected to the action of diphtheria bacilli. This supposition is the logical outcome of the bacteriological evidence which is at our present command on this subject. Thus it has been found, over and over again, that the serum of animals artificially rendered immune to a particular disease, is only efficacious in affording protection to other animals infected with *identically the same microbial disease*. This has quite recently been carefully worked out by Pfeiffer, who has shown that the serum of horses rendered immune to cholera is only efficacious in cases of infection from the cholera vibrio, and that it is absolutely inoperative in protecting from an infection due to any other vibrio, however nearly the latter may resemble that of the cholera vibrio.

But we have seen that protective serum may be possessed by individuals who have never had diphtheria, on whom, moreover, careful investigation has not been able to reveal the invariable presence of true diphtheria bacilli. So far it must be acknowledged, then, that we have no working hypothesis which enables us to comprehend aright the circumstances which determine the presence of or control the generation of anti-diphtheritic serum in the human system, and we are therefore powerless to either stimulate or diminish its production; but we are, however, in a position to regulate, to a great extent, the dissemination of diphtheria virus from one individual to another.

It has recently been shown that children taken from diphtheria surroundings, and not themselves suffering from the disease, in a large number of cases carry about with them in their nasal and throat passages typical virulent diphtheria bacilli, and that although they do not necessarily themselves develop the disease, they thus become the dangerous carriers of infection.

It is considered essential, therefore, that no member of a family where diphtheria has occurred, should be allowed to mix with others until a bacteriological examination has shown that diphtheria bacilli are absent from the air passages, neither are those who have recovered from this disease to be permitted to resume their usual occupations until the absence of diphtheria bacilli has been conclusively proved.

In Germany such systematic examinations are rapidly

gaining ground, and already in some of the hygienic institutes the practice is regularly carried out. Indeed, in Königsberg, von Esmarch has suggested that to facilitate the universal adoption of such precautions, the throat of the patient or suspect should be wiped with a sterile sponge, and the latter forwarded for bacteriological examination.

The causes at present at work contributing to the generation of diphtheria in London have yet to be found.

If the contraction of diphtheria primarily depends upon the presence or absence of anti-toxic serum in the human system, then it would appear that some causes are at work tending to deprive the individual of the capacity to generate this means of protection.

It is difficult to conceive, and hard to realise, that the advance in sanitary science and improved hygienic conditions of the present day have but resulted in London in increased facilities for generating and distributing the virus of diphtheria, and that so far we have proved ourselves hopelessly unable to fathom this problem, or to stay the progress of this terrible malady.

REPORT OF THE COMMITTEE APPOINTED BY THE SMITHSONIAN INSTITUTION TO AWARD THE HODGKINS FUND PRIZES.¹

THE Committee of Award for the Hodgkins prizes of the Smithsonian Institution has completed its examination of the two hundred and eighteen papers submitted in competition by contestants.

The Committee is composed of the following members: Dr. S. P. Langley, Chairman, *ex-officio*; Dr. G. Brown Goode, appointed by the Secretary of the Smithsonian Institution; Assistant Surgeon-General John S. Billings, by the President of the National Academy of Sciences; Prof. M. W. Harrington, by the President of the American Association for the Advancement of Science. The Foreign Advisory Committee, as first constituted, was represented by M. J. Janssen, Prof. T. H. Huxley, and Prof. von Helmholtz; and after the recent loss of the latter, Dr. W. von Bezold was added. After consultation with these eminent men the Committee decided as follows:

First prize, of ten thousand dollars, for a treatise embodying some new and important discoveries in regard to the nature or properties of atmospheric air, to Lord Rayleigh, of London, and Prof. William Ramsay, of the University College, London, for the discovery of argon, a new element of the atmosphere.

The second prize, of two thousand dollars, is not awarded, owing to the failure of any contestant to comply strictly with the terms of the offer.

The third prize, of one thousand dollars, to Dr. Henry de Varigny, of Paris, for the best popular treatise upon atmospheric air, its properties and relationships. Dr. de Varigny's essay is entitled "*L'Air et la Vie*."

(Signed), S. P. LANGLEY,
G. BROWN GOODE,
JOHN S. BILLINGS,
M. W. HARRINGTON.

August 9, 1895.

SUPPLEMENTARY REPORT OF THE COMMITTEE APPOINTED BY THE SMITHSONIAN INSTITUTION TO AWARD THE HODGKINS FUND PRIZES.

After having performed the function to which the Committee was called, as announced by the circular of the Secretary of the Smithsonian Institution, dated March 31, 1893, which function did not include the award of any medals, there remained several papers to which the

¹ Communicated by Dr. S. P. Langley, Secretary Smithsonian Institution.

Committee had been unable to give any prize, and to which they had felt desirous to give some honourable mention, and on their representing this to the Smithsonian Institution, they had been commissioned to do so, and also to give certain medals of silver and bronze which had been subsequently placed at their disposition.

The Committee has decided that honourable mention should be made of the papers, twenty-one in number, included in the following list, which also gives the full names, titles, and addresses of the authors, and the mottoes or pseudonyms which in four instances were employed. To three of the papers a silver medal is awarded, and to six a bronze medal.

Honourable Mention with Silver Medal.

Mr. A. L. Herrera and Dr. Vergara Lopez, of the city of Mexico: "La Atmosfera de las altitudes y el bienestar del hombre."

Mr. C. L. Madsen ("Geo"), Helsingør, near Copenhagen, Denmark.

Mr. F. A. R. Russell, of London, Vice-President of the Royal Meteorological Society of Great Britain: "The Atmosphere in Relation to Human Life and 'Health.'"

Honourable Mention with Bronze Medal.

Mr. E. Deberaux-Dex and Mr. Maurice Dibos ("Spes"), of Rouen, France: "Études des courants aériens continentaux et de leur utilisation par des parostats long-courriers."

Dr. O. Jesse, of Berlin, "Die leuchtenden Nachtwolken."

Dr. A. Loewy, of Berlin: "Untersuchungen über die Respiration und cirkulation unter verdünnter und verdichteter Sauerstoffarmer und sauerstoffreicher Luft."

Mr. Alexander McAdie ("Dalgetty"), of Washington: "The known properties of atmospheric air considered in their relationships to research in every department of natural science, and the importance of a study of the atmosphere considered in view of those relationships: the proper direction of future research in connection with the imperfections of our knowledge of atmospheric air and the conditions of that knowledge with other sciences."

Mr. Hiram S. Maxim, of Kent, England: "Natural and Artificial Flight."

Dr. Franz Oppenheimer and Dr. Carl Oppenheimer ("E pur si muove"), of Berlin, Germany: "Ueber atmosphärische Luft, ihre Eigenschaften und ihren Zusammenhang mit dem menschlichen Leben."

Honourable Mention.

Mr. E. C. C. Baly, of University College, London: "The decomposition of the two constituents of the atmosphere by means of the passage of the electric spark."

Prof. F. H. Bigelow, of Washington: "Solar and Terrestrial Magnetism and their relation to Meteorology."

Dr. J. B. Cohen, of Yorkshire College, Leeds, England: "The Air of Towns."

Dr. F. J. B. Cordeiro, of Washington:—"Hypsometry."

Prof. Émile Duclaux, of the French Institute, Paris, France: "Sur l'actinométrie atmosphérique et sur la constitution actinique de l'atmosphère."

Prof. Dr. Gieseler, of Bonn, Germany: "Mittlere Tagestemperaturen von Bonn, 1848-88."

Dr. Ludwig Illosvay von Nagy Ilsova, Professor in the Royal Joseph Polytechnic School, Budapest, Hungary: "Ueber den unmittelbar oxydierenden Bestandtheil der Luft."

Dr. A. Magelssen, of Christiania, Norway: "Ueber den Zusammenhang und die Verwandtschaft der biologischen, meteorologischen, und kosmischen Erscheinungen."

Dr. A. Marcuse, of the Royal Observatory, Berlin, Germany: "Die atmosphärische Luft."

Prof. C. Nees, of the Polytechnic School, Copenhagen, Denmark: "The Use of Kites and Chained Air-balloons for observing the Velocity of Winds, etc."

Surgeon Charles Smart, of Washington: "An Essay on the Properties, Constitution and Impurities of Atmospheric Air, in relation to the promotion of Health and Longevity."

Dr. F. Viault, of the Faculty of Medicine, Bordeaux, France: "Découverte d'une nouvelle et importante propriété

physiologique de l'Air atmosphérique (action hématogène de l'air raréfié)."

(Signed), S. P. LANGLEY,
G. BROWN GOODE,
JOHN S. BILLINGS,
M. W. HARRINGTON.

August 9, 1895.

THE PERSEIDS OF 1895.

THE conditions have been very unfavourable for the observation of this meteoric display. The moon's presence in the firmament overpowered the smaller meteors, and unfortunately the weather was very unsettled, the first half of August being notable for its frequent rains and clouded skies.

It was intended to obtain some observations at the end of July before moonlight interfered, but the attempt failed at several stations. On July 25, however, Prof. A. S. Herschel, at Slough, availed himself of a pretty clear interval between 11h. and 12h. 40m. to watch for Aquarids and early Perseids. He found meteors rather bright and plentiful, and the chief radiants in Cassiopeia, Camelopardus, Perseus, Aquarius, and Capricornus. At 11h. 32½m. an Aquarid brighter than Jupiter was recorded in a position a few degrees north of the head of Draco, and at 11h. 55m. a bright Capricornid, equal to Jupiter, traversed a long slow course from the north-east region of Cassiopeia.

On August 2, Mr. E. R. Blakeley, of Dewsbury, watched the sky from 11½h. to 14½h., and observed thirty-one meteors, of which seventeen, or slightly more than one-half, were Perseids with a radiant about 3° in diameter at 35½° + 52°. Mr. Blakeley regards the declination as rather uncertain; it is probably 3° S. of the real position. The brightest meteors seen were Perseids; very fine ones were noted at 13h. 33m. and 13h. 45m.

On August 7, between 10h. and 12½h., some meteors were observed at Slough, Bridgwater, and Bristol. Prof. Herschel at the former place found them very scarce, however, for though the sky was quite clear from 10h. 50m. to 12h. only four meteors were detected. Mr. Corder, at Bridgwater, noted twelve in a watch of 2½ hours. Three or four of the paths indicated a good radiant at η Persei, but others seemed to come from just below γ. At Bristol the writer recorded seven meteors in 1½h., and of these five were Perseids with a radiant at 41° + 57°, which agrees with the usual position on August 7. Three meteors were observed at more than one station, and the particulars are as follows:

10h. 12m.—A swift, streak-leaving meteor of 2-3 magnitude observed at Bridgwater and Bristol. Height at beginning 43 miles over Bromyard, Hereford, and it disappeared at an elevation of 28 miles near Crickhowell, Brecon. The real length of path was 42 miles, and the earth-point at Barnstaple, Devon. The radiant was at 45° + 47°, so that it was not a true Perseid, but a member of a well-known contemporary shower near α Persei.

11h. 4m.—A fine moderately swift meteor variously estimated as first magnitude, equal to α Lyrae, and Jupiter by observers at Bridgwater, Slough and Bristol respectively. Height at beginning 74 miles, at end 45 miles. The meteor passed from above Newport, Mon., to Gellygaer, Glam. Real length of path 33 miles. Earth-point 5 miles north of Pontardawe. Radiant at 333° + 36° in the south region of Lacerta.

11h. 29m.—A swift, streak-leaving meteor of second magnitude observed at Bridgwater and Bristol. Height at beginning 105 miles over Stratford-on-Avon, at end 63 miles over Oldbury-on-Severn. Real length of path 64 miles. Earth-point near Chumleigh, Devon. Radiant at 38° + 57°, so that the meteor was a true Perseid.

On August 9, Mr. Corder, at Bridgwater, watched from 10h. 34m. to 13h. 45m., and saw about 30 meteors, nearly all of which were Perseids. He found the radiant indefinitely marked. A certain proportion of the meteors